REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Final Official Action dated 5 January 2004. Responsive to the rejections made in the Official Action, Independent Claim 6 has been amended to clarify the combination of method steps that form the invention of the subject Patent Application.

In the Official Action, Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Crawford, et al., U.S. Patent #5,978,063; and Claims 7-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Crawford, et al. in view of Jie, et al., U.S. Patent #6,498,635. The Examiner states that Crawford, et al. disclose smart spacers for active matrix liquid crystal projection light valves and method which has a step of providing a bottom substrate for a display having non-active areas and active areas, a step of forming a coating on a bottom substrate, and a photolithographic step to result in formation of spacers. But, as the Examiner further states, the reference does not appear to explicitly specify providing a mask associated with each substrate and the mask having shielded zones of one mask different than shielded zones of another mask. However, the Examiner concludes that since Crawford, et al. specifically teaches that the positioning of spacers is decided by a mask design, the spacer distribution and count may also be controlled. The Examiner further concludes that since the reference discloses a method for forming spacers on micro-displays, where the positioning of spacers is decided by a mask design, it would have been obvious to one of ordinary skill

in the art at the time the invention was made to use different mask designs for forming spacers in varying distributions on substrates for optimal optical performance.

It is respectfully submitted that the invention of the subject Patent Application as now claimed is directed to a method for forming spacers in a displaying device comprising a plurality (at least two) of micro-display units. The steps of the method include providing a substrate for each of the plurality (at least two) of micro-display units with reflective pads formed on each substrate. The pads are spaced from each other by non-reflective areas. Each of the micro-display units is associated with a different color whose light emissions together form a color image. The method includes the step of forming a coating of transparent and non-conductive material on each substrate over the reflective pads formed thereon. The method further includes the step of forming a set of a plurality (at least two) of masks where each of these masks is formed for a respective one of said at least two micro-display units. Each mask includes a number of shielded zones corresponding to non-reflective areas of a respective substrate. Each of the shielded zones of one mask of the created set of masks is positioned to be in non-overlapping relationship with the shielded zones of another one of the set of the plurality of the masks. The method of the present invention further includes the step of performing a lithographic operation on the transparent non-conductive coating on the substrate of each micro-display unit by using a respective one mask of said set of the masks for each of said at least two micro-display units, where the portions of the

transparent non-conductive material on the substrate of each micro-display unit correspond to the shielded zones of the respective mask associated therewith remain on the substrate, thus forming spacers of the displaying device, where the spacers of one of the micro-display units are positioned in a non-overlapping fashion with the spacers of another micro-display unit. By that arrangement, the color image produced by light emission from the plurality of micro-displays is devoid of dark or white spots on the background of the image that otherwise would result in the superposition of images of the spacers of the plurality of micro-display units of the displaying device in question.

In Crawford, et al., in contrast to the present invention, a method is presented for creating spacers for only a single micro-display cell and there is no discussion for either creation of spacers in multi-display cells of a displaying device, or for specific mutual disposition of the spacers, in non-overlapping relationship, in different display cells of the overall displaying device.

Thus, the Crawford, et al. reference fails to disclose or suggest the step of forming a set of masks for a displaying device to be used in formation of spacers of the entire displaying device which includes several display cells.

While in the present invention, the creation of spacers in the entire display device is a feature and advantage that is implemented by providing a set of a plurality of masks that are distinct, but related each to the other in that the shielded zones of each mask of the set of a plurality of masks do not coincide with shielded zones of any other mask

from the set of the masks. It is clear, therefore, that the present invention is concerned with providing not of a single mask, but quite to the contrary, with creating of a set of a plurality of masks for the entire displaying device. The set of masks is designed for avoiding any overlapping of the spacers in the entire displaying device.

Although Crawford, et al. reference teaches different positioning of the spacers 54 at the intersection of the data lanes and scan lanes, as shown in Figs. 10a-10c of Crawford, et al., all of these variations of spacer positioning are for a single liquid crystal display cell. Nowhere does the reference disclose, suggest, or render obvious the relationship between the spacers in different liquid crystal display cells, as claimed in the present invention. It is the key feature of the present invention, that a set of the masks are created for the displaying device, where the designs of the masks are related to one another such that the shielded zones of each mask in the set of masks are positioned in such a way to avoid overlapping of the shielded zones of the other masks of the set. As a result, the spacers in the entire displaying device do not overlap.

It is respectfully submitted that the mere fact that a worker in the art could rearrange the elements of the reference device to meet the terms of the Claim is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of Applicant's Specification, to make the necessary changes in the reference device. Although the Examiner stated that Crawford, et al. reference is evidence that ordinary workers in the

art of liquid crystals would use different mask designs for forming spacers in varying distributions on substrates for optimal optical performance, the Examiner has presented no evidence to support a conclusion that a worker in the art would have had any motivation for designing a set of masks for multiple micro-display units that are related to each other by arranging respective shielded areas so as to avoid overlapping thereof. The Crawford, et al. reference fails to recognize the problem of an overlapping distribution of the spacers in a displaying device having multiple micro-displaying units. In the present invention, this problem associated with prior art displays, that of white or dark spots, is solved by the method of the invention of the subject Patent Application, wherein a plurality of masks are formed as a set of mutually related masks where the shielded zones of any one mask does not overlap with the shielded zones of any other mask of said set of masks. Thus, a non-overlapping distribution of the spacers for the entire displaying device containing a plurality of micro-display units (cells) is produced. As the reference doesn't recognize the problem solved by the invention of the subject Patent Application, it therefore cannot be said to provide a motivation for making obvious Applicant's solution to that problem.

The Jie, et al. reference discloses a method of forming insulating material alignment posts (spacers) associated with active device structures where the alignment posts are made of silicone nitride/oxide multi-layers for insulation, alignment, and for effective manufacturable method. While the alignment posts 15 of Jie, et al., formed of

silicone nitride, are disposed at locations between the adjacent pixels 30, the reference neither discloses nor suggests location of the alignment posts on any given substrate different from those of another substrate.

The Jie, et al. reference, similar to Crawford, et al., is directed to a single LCOS panel structure and does not contemplate use in a multi-LCOS (liquid crystal on silicone) panel display device. In the present invention, in contrast to Jie, et al., the multi-LCOS panel displaying device structure is the subject matter to which the invention is directed, requiring a distribution of the spacers in the entire displaying device to be coordinated. The present invention is used to produce multi-LCOS panel displaying devices, where LCOS panels present the same characteristics for R (red), G (green), and B (blue) channels that use VAN (vertical alignment nematic) techniques. In the VAN LCOS displaying device, the same panel can be used in any of the three channels, R, G, or B, making the VAN LCOS display device easy to manufacture and less expensive. The method of the instant invention eliminates the image flaws that were heretofore caused by superposition of spacers of one micro-display with those of the other of the micro-displays.

Both Jia, et al. and Crawford, et al. present a formation of spacers in a single panel by a single mask. No provision of a multiplicity of masks is suggested or disclosed in either of the cited prior art references. It is respectfully submitted that if one were to use the teaching of either of the cited references, e.g., using a single mask for creation of

spacers for application to a multi-liquid crystal display cell displaying device, then the resulting display would not have spacers in different liquid crystal display cells at different locations.

None of the known prior art discloses or suggests the step of forming of a set of at least two masks, where the shielded zones of one mask from the set of masks are positioned at different locations than the shielded zones of another of the set of masks. This novel step in the method results in positioning of the spacers of one of the at least two micro-display units in non-overlapping relationship with the spacers of another of the at least two micro-display units. Thus, neither Crawford, et al., alone, or in combination with Jie, et al., can make obvious the invention of the subject Patent Application, as now claimed. It is respectfully submitted that the Independent Claim 6, as amended, is patentably distinct from the prior art references taken singly or in combination. Therefore, Claim 6 should now be allowable.

Claims 7-10, dependent on Claim 6, are patentably distinct for at least the same reasons as the Independent Claim 6, and thus should also be allowable.

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It is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

FOR: ROSENBERG KLEIN & LEE

David I. Klein
Registration #33,253

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3458 Ellicott Center Drive, Suite 101
Ellicott City, MD 21043
(410) 465-6678

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Date: 5/3/2004